CLAIMS

What Is Claimed Is:

1. A proximity detection circuit comprising:

an asymmetric oscillator circuit having its on-period set by a resistor network comprising a plurality of fixed resistors and at least one variable resistor and having its off-period set by at least one fixed resistor and by at least one first single diode;

a first static protection circuit comprising a first plurality of diodes, one said diode adapted to conduct away from ground, another said diode adapted to conduct toward the supply voltage;

a reset path wherein a second single diode provides a discharge path for an antenna wherein said antenna is discharged to the same voltage for every time period;

the asymmetric oscillator being adapted to send an approximately uniform amount of charge during its on-period to said antenna;

the antenna voltage being decreased when the capacitance of the antenna is increased by a detected object;

a second static protection circuit comprising a second plurality of diodes, one said diode adapted to conduct away from ground, another said diode adapted to conduct toward the supply voltage;

an antenna impedance buffer comprising operational amplifier operated as a unity gain follower with the output terminal of said operational amplifier being fed back to the inverting input terminal;

a voltage peak detector comprising a third single diode, a current-limiting resistor, a peak storage capacitor and a bleed off resistor, said third single diode and said peak storage capacitor being adapted to capture the positive peak of the exponential waveforms, said current limiting resistor being adapted to limiting current flow and

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to providing said antenna impedance buffer output with more phase margin to prevent oscillation, said bleed-off resistor adapted to providing a discharge pathway for said peak storage capacitor;

a low-pass filter adapted to filter out about 50 or about 60 Hz alternating current interference frequencies, said low-pass filter comprising an in-line resistor and a capacitor with one side tied to ground;

an amplifier with gain and voltage offset;

an auto-compensation capacitor adapted to filter out changes in DC voltage levels of signals while allowing transient signals to pass through;

a three-position switch adapted to provide three levels of detection sensitivity; and

an output comparator adapted to generate an output on signal when the signal voltage, applied to the non-inverting input terminal of said comparator, is greater than the reference voltage, which is applied to the inverting input terminal of said comparator.

2. The circuit as in claim 1 wherein said detected object comprises a material with a dielectric constant at least equal to one-half the dielectric constant of water.

3. The circuit as in claim 1 wherein said transient signal is generated by a moving hand.

4. The circuit as in claim 1 further comprising:

a motor activation switch connected to receive an output of a flip-flop activated by said output signal of said output comparator.

5. A proximity detection circuit comprising:

an oscillator circuit comprising a first comparator adapted to provide an asymmetric signal as input to an antenna sensor;

an antenna sensor adapted to respond to a change in dielectric constant in said sensor's proximity;

a first operational amplifier adapted to buffer said antenna sensor to a peak detector wherein said antenna sensor has high impedance and said peak detector has low impedance;

a low pass filter adapted to filter out line noise frequencies in the 50 Hz and 60 Hz line ranges;

a second operational amplifier adapted to provide voltage offset to an input signal to said second operational amplifier and to amplify a signal from said peak detector as output from said second operational amplifier;

a second comparator adapted to produce an output pulse wherein said output signal from said second operational amplifier is an input signal to said second comparator and is of sufficient duration, amplitude and speed of change to produce said output pulse .

6. A method for detecting small capacitance changes comprising the steps of:

detecting time of charge integration for an antenna detector with a larger dielectric constant; and

integrating a peak voltage proportional to said charge integration time wherein said charge integration time is inversely proportional to the resistance-capacitance time constant;

producing an output signal from a peak voltage pulse integration;

said output signal being adapted to activate a motor-controlling logic circuit.

7. The method as in claim 6 further comprising the step of:

activating a motor switch when detecting a change in the output state of the flip-flop.

8. A method for detecting small capacitance changes, utilizing a proximity detection circuit, comprising the steps of:

producing an asymmetric oscillator circuit having its on-period set by a resistor network comprising a plurality of fixed resistors and at